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346831

3 May 2007

Mr. Russell D. Hart  
Remedial Project Manager (SR-6J)  
U.S. Environmental Protection Agency  
Region V  
77 West Jackson Boulevard  
Chicago, IL 60604

RFW Work Order No. 13471.003.001  
TRONOX Work Order No. 40-50-01-AKW-AE

Re: 1<sup>st</sup> Quarter 2007 Groundwater Monitoring Report  
Moss-American Site, Milwaukee, WI

Dear Mr. Hart:

Enclosed is the groundwater monitoring report for the 1<sup>st</sup> quarter of 2007. Should you have any questions or comments, please contact me at (847) 918-4142 or Keith Watson at (405) 775-5475.

Very truly yours,

WESTON SOLUTIONS, INC.

Thomas P. Graan, Ph.D.  
Principal Project Manager

TPG\tg

cc: T. Wentland, WDNR  
K. Watson, KMC



**QUARTERLY GROUNDWATER TREATMENT  
PERFORMANCE MONITORING REPORT  
Q1 2007  
MOSS-AMERICAN SITE  
MILWAUKEE, WISCONSIN**

Prepared for

**TRONOX, LLC**  
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211 N. Robinson Avenue  
Oklahoma City, OK 73102

Prepared by

**WESTON SOLUTIONS, INC.**  
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May 2007

W. O. No. 13741.003.001.0020

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## SECTION 1 INTRODUCTION

In accordance with paragraph 4a of the Remedial Design/Remedial Action Statement of Work (RD/RA SOW), Tronox LLC (TRONOX), is required to implement a groundwater monitoring program capable of detecting changes in chemical concentrations in the groundwater. TRONOX has directed Weston Solutions, Inc. (WESTON®) to perform this work. As previously agreed, the monitoring network currently includes five shallow groundwater monitoring wells (MW-5S, MW-6S, MW-7S, MW-9S, and MW-27S), eight containment performance monitoring wells (MW-30S, MW-31S, MW-32S, MW-33S, MW-34S, MW-35S, MW-36S and MW-37S), which are screened in the shallow groundwater-bearing unit underlying the site, nine piezometer wells (PZ-01, PZ-02, PZ-03, PZ-04, PZ-05, PZ-06, PZ-07, PZ-09, and PZ-10) and one staff gauge (SG-01). The locations of the groundwater monitoring wells, piezometers, and staff gauge are indicated on Figure 1-1.

The Quality Assurance Project Plan for Installation of Groundwater Remedial System (QAPP) (WESTON, October 1999) requires TRONOX to implement a groundwater monitoring program capable of indicating groundwater chemistry before, during, and after treatment. In addition, the hydraulic gradient is calculated at each treatment gate and is used to estimate groundwater flow velocity through the treatment gate remediation system. The monitoring network includes six groundwater treatment gates (TG1 through TG6) with three treatment performance monitoring wells located at each groundwater treatment gate. The treatment performance monitoring wells include TG1-1, TG1-2, TG1-3, TG2-1, TG2-2, TG2-3, TG3-1, TG3-2, TG3-3, TG4-1, TG4-2, TG4-3, TG5-1, TG5-2, TG5-3, TG6-1, TG6-2, and TG6-3. The locations of the treatment performance monitoring wells are indicated on Figure 1-1.

In addition to the on-site groundwater monitoring wells, four shallow groundwater monitoring wells (MW-A, MW-B, MW-C and MW-D) were installed in September 2003 to monitor groundwater conditions between old and new river channels in the Reach 1. These four wells are sampled annually (during Q3 sampling events) in accordance with the groundwater monitoring program for the Reach 1 area.

In December 2004, seven additional shallow groundwater monitoring wells (MW-E, MW-F, MW-G, MW-H, MW-I, MW-J and MW-K) were installed to monitor groundwater conditions between old and new river channels in the Reaches 2 and 3. These seven wells are sampled annually (during Q3 sampling events) in accordance with the groundwater monitoring program for the Reaches 2 and 3.

Some wells that were previously part of the groundwater-monitoring network have been removed to facilitate soil remediation activities. TW-09, MW-8S, and MW-8I were removed during excavation activities and installation of the funnel-and-gate groundwater treatment system in 1999. Wells MW-4S and MW-4I were removed during early Q3 2001, and well TW-05 was removed in early Q4 2001 during the “hot spot” soil excavation and treatment process. Wells MW-20S and MW-20I were removed during Q3 2002 when the Little Menomonee River (LMR) diversion work took place.

A total of 22 groundwater monitoring wells and piezometers were abandoned in November 2006 and March 2007, and two monitoring wells were installed in November 2006. Wells abandoned included intermediate depth wells MW-3I, MW-7I, MW-9I, and MW-11I; wells MW-14S, MW-15S, MW-21S, MW-22S, and MW-23S located in the Northeast Landfill; upgradient or sidegradient wells MW-2S, MW-3S, MW-10S, MW-11S, MW-12S, MW-24S, MW-25S, MW-26S, and TW-03; MW-29S and MW-36S, which were redundant sampling points located near other monitoring wells; and MW-6S and MW-28S, which consistently showed constituent concentrations below comparison levels. Groundwater monitoring wells MW-38S and MW-39S were installed in the area of stagnating groundwater, near MW-7S and MW-34S.

Several modifications have been made to the sampling program. The first modification was the reduction of performance monitoring well sampling frequency. The treatment performance monitoring wells were originally sampled on a monthly basis, but sample data showed that minimal changes in site conditions were found on a monthly basis. Therefore a change in sampling frequency from monthly to quarterly was recommended. This recommendation was approved by the Wisconsin Department of Natural Resources (WDNR) and the United States Environmental Protection Agency (collectively “Agencies”) and the monthly sampling program was discontinued after the October 2002 sampling event.



The second modification was the reduction of the groundwater monitoring program scope. It was proposed that some shallow monitoring wells (MW-3S, MW-10S, MW-13S, MW-25S, MW-26S, and MW-20S) and intermediate monitoring wells (MW-3I, MW-7I, MW-9I, and MW-20I) be removed from the groundwater monitoring program due to zero or few sample detections in these wells. The Agencies approved this recommendation, and the sampling of these wells was discontinued after the September (Q3) 2002 sampling event; however, per the Agencies' request, these wells were not abandoned, with the exception of MW-20S and MW-20I abandoned during LMR diversion. Instead these wells are utilized to collect water level measurements for the production of more accurate quarterly groundwater potentiometric maps.

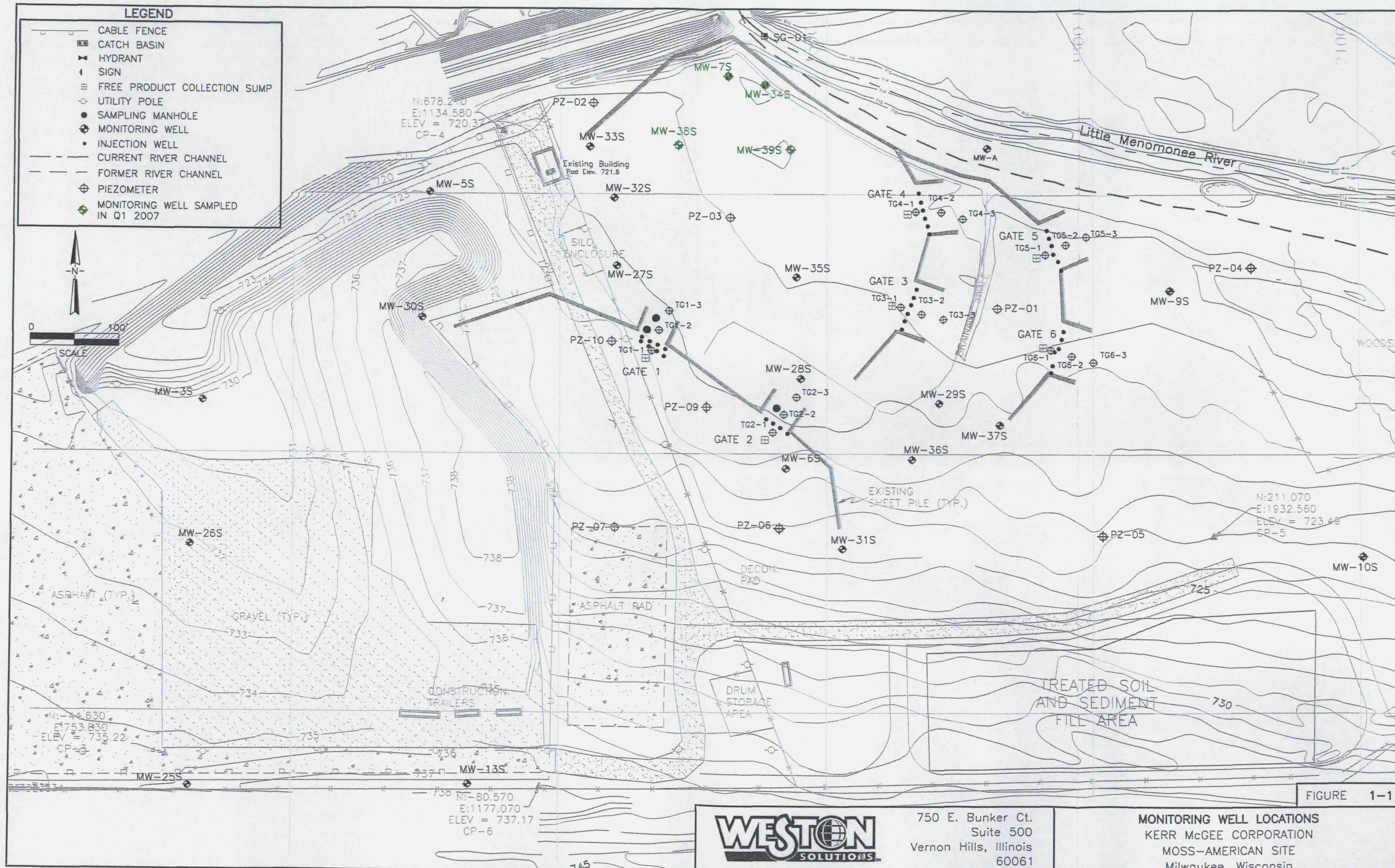
The third modification was another reduction of the groundwater monitoring program scope. This modification, which was approved by the Agencies, reduced the sampling event frequency to an annual sampling program for the groundwater treatment gate, containment performance, and five shallow monitoring wells. Additionally, per this modification, the middle groundwater monitoring well at each of the six treatment gates will no longer be sampled. The 11 river reach wells will continue to be sampled on an annual basis. Groundwater sampling for these wells will occur during Q3. The four monitoring wells that will be used to monitor the phytoremediation (MW-7S, MW-34S, MW-38S, and MW-39S) will be sampled on a semi-annual basis in March and September.

In accordance with paragraph 4a (i) of the RD/RA SOW, the field measurement and analysis of groundwater samples collected from the shallow and containment performance groundwater monitoring wells include groundwater elevation, pH, temperature, turbidity, specific conductance, oxidation-reduction (redox) potential, and dissolved oxygen (DO). Required laboratory analyses include benzene, toluene, ethylbenzene, and xylene (BTEX collectively) and the following polynuclear aromatic hydrocarbon (PAH) compounds: acenaphthylene, acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, fluorene, fluoranthene, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene, and pyrene.

In accordance with Addendum No. 1 to the QAPP (WESTON, May 2001), the quarterly field measurements for samples collected from the treatment performance monitoring wells include groundwater elevation, pH, temperature, turbidity, specific conductance, redox potential, and DO. Laboratory analyses required for the treatment performance wells include microbial enumeration, nitrate-nitrogen ( $\text{NO}_3\text{-N}$ ), nitrite-nitrogen ( $\text{NO}_2\text{-N}$ ), total Kjeldahl nitrogen (TKN), ammonia-nitrogen ( $\text{NH}_3\text{-N}$ ), total phosphate-phosphorous ( $\text{PO}_4\text{-P}$ ), orthophosphate (ORP), biochemical oxygen demand (BOD), chemical oxygen demand (COD), total organic carbon (TOC), BTEX, and the PAHs indicated in the above paragraph.

This report presents the results of the Q1 sampling activities conducted at the site. In Q1, only the four groundwater monitoring wells located in the proposed phytoremediation area were sampled. The remainder of this report presents the findings of the Q1 sampling activities.





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**MONITORING WELL LOCATIONS**  
KERR MCGEE CORPORATION  
MOSS-AMERICAN SITE  
Milwaukee, Wisconsin



## **SECTION 2**

### **ON-SITE GROUNDWATER MONITORING RESULTS**

The Q1 2007 groundwater-monitoring event at the Moss-American site was completed on 28 March 2007. Tasks completed during the field effort for this event included the collection of groundwater elevation data from the four shallow groundwater monitoring wells located in the proposed phytoremediation area (MW-7S, MW-34S, MW-38S, and MW-39S). Following groundwater elevation and parameter measurements, groundwater samples were collected from these shallow monitoring wells. The results of the Q1 2007 groundwater sampling event are described in the following subsections.

#### **2.1 GROUNDWATER ELEVATION MEASUREMENTS**

Depths to water measurements in each of the shallow groundwater monitoring wells were made on 28 March 2007. Monitoring wells MW-38S and MW-39S have not been surveyed for elevation. This will be accomplished during the summer or fall months of 2007 when other site surveying activities are planned. The depth to water measurements, the reference elevations, and the Q1 2007 groundwater elevations will be presented in the Q3 2007 report. The water level measurements for the shallow groundwater monitoring wells and groundwater elevations (as applicable) are presented in Table 2-1.

#### **2.2 GROUNDWATER SAMPLE ANALYTICAL RESULTS**

Groundwater samples were collected from a total of four shallow monitoring wells screened within the shallow groundwater-bearing unit. In addition to the investigative groundwater samples collected, one field sample duplicate. All groundwater samples were field screened and laboratory analyzed for the parameters indicated in Section 1.

##### **2.2.1 Field-Measured Parameters**

The groundwater samples were measured in the field for pH, specific conductance, temperature, and turbidity. The field parameters were collected using a YSI 556 portable water quality meter

and a HS Scientific DRT-15CE turbidimeter. The groundwater pH, specific conductance, temperature, and turbidity were monitored during well purging prior to sampling. Water quality parameter measurements were not collected from well MW-34S due to the presence, or the historical presence, of free product in the purge water during Q3 2006.

#### **2.2.1.1 pH**

The pH of the groundwater samples collected during Q1 2007 ranged from 7.02 to 7.24 pH standard units (S.U.). pH is an important factor in determining the feasibility of bioremediation of contaminants in the site groundwater because biological systems typically function only in narrow pH ranges (typically 6.5 to 8.5 S.U.), and because microbial growth rates are pH dependent.

#### **2.2.1.2 Specific Conductance**

The specific conductance, or conductivity, of the groundwater samples collected during Q1 2007 ranged from 0.943 to 1.212 millimhos per centimeter (mmho/cm). Conductivity of water is a measure of the ability of the solution to carry an electrical current that is transported by ions in the solution; therefore, conductivity is used as an indicator of the total dissolved solids (TDS) present in a water sample. As the dissolved solids content of a solution increases, the capacity for the water to transmit electrical current increases. Although conductivity is a measure of the aggregate dissolved solids in the water it may be correlated to the readily available nutrient levels in the water, since TDS includes nitrate, nitrite, ammonium, and phosphate ions.

#### **2.2.1.3 Temperature**

Groundwater temperatures ranged from 5.9 to 7.4 degrees Celsius (°C) during Q1 2007. Temperature is an extremely important factor in bioremediation because microbial growth rates are greatly dependent upon temperature.

#### **2.2.1.4 Turbidity**

Turbidity ranged from 4.37 to 329 nephelometric turbidity units (NTU) during Q1 2007. Turbidity is a measure of the clarity of water and is used as an indicator of the solids present in a water sample and overall water quality.

### **2.2.2 Laboratory Analyses**

The results of the laboratory analyses performed on the groundwater samples collected during Q1 2007 are provided in Appendix A. A discussion of the results of the laboratory analyses performed on the groundwater samples are presented in the following subsections.

#### **2.2.2.1 Laboratory Analyses for BTEX and PAH**

Each groundwater sample collected during the Q1 2007 sampling event was analyzed for BTEX and PAH compounds. The results of these analyses are presented and compared to WDNR Preventive Action Limits (PALs) and Enforcement Standards (ESs) in Table 2-2. Table 2-2 identifies parameters detected at concentrations exceeding their respective PALs (shown as bolded values). Parameters with concentrations exceeding both PALs and ESs are presented as shaded and bolded values in Table 2-2. Exceedances are summarized in the following paragraphs.

#### **Groundwater Sample Results**

As shown in Table 2-2, benzene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, fluoranthene, fluorene, naphthalene, and pyrene were detected at concentrations exceeding their respective PALs and/or ESs in the groundwater samples collected from the shallow monitoring well network. The results are as follows:

### WDNR PAL Exceedences

- Benzene was detected at concentrations exceeding the PAL of 0.5 µg/L in the groundwater samples collected from wells MW-34S and MW-38S.
- Benzo(a)pyrene was detected at a concentration exceeding the PAL of 0.02 µg/L in the groundwater sample collected from well MW-34S.
- Benzo(b)fluoranthene was detected at a concentration exceeding the PAL of 0.02 µg/L in the groundwater sample collected from well MW-34S.
- Chrysene was detected at a concentration exceeding the PAL of 0.02 µg/L in the groundwater sample collected from well MW-34S.
- Fluoranthene was detected at a concentration exceeding the PAL of 80 µg/L in the groundwater sample collected from well MW-34S.
- Fluorene was detected at a concentration exceeding the PAL of 80 µg/L in the groundwater sample collected from well MW-34S.
- Naphthalene was detected at concentrations exceeding the PAL of 8 µg/L in the groundwater samples collected from wells MW-7S, MW-34S, and MW-38S.
- Pyrene was detected at a concentration exceeding the PAL of 50 µg/L in the groundwater sample collected from well MW-34S.

### WDNR ES Exceedences

- Benzene was detected at a concentration exceeding the ES of 5 µg/L in the groundwater sample collected from well MW-34S.
- Benzo(a)pyrene was detected at a concentration exceeding the ES of 0.2 µg/L in the groundwater sample collected from well MW-34S.
- Benzo(b)fluoranthene was detected at a concentration exceeding the ES of 0.2 µg/L in the groundwater sample collected from well MW-34S.
- Chrysene was detected at a concentration exceeding the ES of 0.2 µg/L in the groundwater sample collected from well MW-34S.
- Fluoranthene was detected at a concentration exceeding the ES of 400 µg/L in the groundwater sample collected from well MW-34S.
- Fluorene was detected at a concentration exceeding the ES of 400 µg/L in the groundwater sample collected from well MW-34S.

- Naphthalene was detected at concentrations exceeding the ES of 40 µg/L in the groundwater samples collected from wells MW-7S, MW-34S, and MW-38S.
- Pyrene was detected at a concentration exceeding the ES of 250 µg/L in the groundwater sample collected from well MW-34S.

Constituents detected in MW-39S consisted of low concentrations of PAHs. The detected concentrations in MW-39S did not exceed the PALs and ESs.

Table 2-3 presents benzene, naphthalene, fluorene, and benzo(a)pyrene data from the last 12 quarters for monitoring wells MW-7S and MW-34S, as well as the data from Q1 2007 for MW-38S and MW-39S. These four constituents have regularly exceed PALs and/or ESs, either in these four monitoring wells, or other monitoring wells across the site. Benzene, fluorene, and benzo(a)pyrene concentrations have remained relatively constant in MW-7S; however, naphthalene concentrations show an overall decreasing trend in MW-7S. Well MW-34S has shown overall fluctuating levels in naphthalene, fluorene, and benzo(a)pyrene; however, benzene concentrations have remained relatively consistent in MW-34S. Varying levels of free product have been found in MW-34S in the recent past. This correlates with the elevated levels of constituents found in MW-34S. And elevated concentration of naphthalene was detected in monitoring well MW-38S. Fluorene was the only one of these four constituents detected in MW-39S, at a low concentration below PAL and ES levels.



**Table 2-1**

**Groundwater Elevation Measurements  
Moss-American Site  
Milwaukee, Wisconsin  
First Quarter 2007**

<b>Well ID</b>	<b>Ground Elevation</b>	<b>TOC Elevation</b>	<b>Depth to Water</b>	<b>Groundwater Elevation</b>	<b>Product Thickness</b>
MW-7S	719.47	721.59	6.05	715.54	None Detected
MW-34S	718.97	721.52	6.08	715.44	Trace
MW-38S	--	--	3.37	--	None Detected
MW-39S	--	--	2.95	--	

**Notes:**

All values in feet.

All elevation measurements are with respect to Mean Sea Level (MSL).

TOC = Top of well casing.

GW = Groundwater.

Depth to groundwater was measured on 28 March 2007

Ground elevation and TOC elevations at MW-38S and MW-39S will be surveyed in summer or fall 2007.

Table 2-2

**Groundwater Sample Analytical Results  
Moss-American Site  
Milwaukee, Wisconsin  
First Quarter 2007**

Field Sample ID	MW-33S 03/28/2007	MW-34S 03/28/2007	MW-38S 03/28/2007	MW-38S Dup 03/28/2007	MW-39S 03/28/2007		
Location ID	MW-33S	MW-34S	MW-38S	MW-38S	MW-39S		
Sample Date	3/28/2007	3/28/2007	3/28/2007	3/28/2007	3/28/2007		
Unit	ug/l	ug/l	ug/l	ug/l	ug/l	WDNR PAL (UG/L)	WDNR ES (UG/L)
<b>BTEX</b>							
Benzene	0.0 U	<b>8.0 J</b>	<b>2.4 J</b>	<b>2.0 J</b>	1.0 U	0.5	5
Ethylbenzene	8.6	28	7.6	6.9	1.0 U	140	700
Toluene	0.0 U	2.0	1.0 U	1.0 U	1.0 U	68.6	343
Total Xylenes	8.2 J	27	5.5 J	4.8 J	3.0 U	124	650
<b>PAHS</b>							
Acenaphthene	16 J	2100	5.1 J	4.6 J	2.2 J	NA	NA
Acenaphthylene	21	300	18 J	18 U	1.6 U	NA	NA
Anthracene	0.045 U	480	0.045 U	0.044 U	0.12 J	600	3000
Benz(a)anthracene	0.023 U	320	0.023 U	0.022 U	0.023 U	NA	NA
Benz(a)pyrene	0.023 U	<b>110</b>	0.023 U	0.022 U	0.023 U	0.02	0.2
Benz(b)fluoranthene	0.045 U	<b>120</b>	0.045 U	0.044 U	0.046 U	0.02	0.2
Benz(ghi)perylene	0.11 U	44	0.11 U	0.11 U	0.11 U	NA	NA
Benz(k)fluoranthene	0.023 U	68	0.023 U	0.022 U	0.023 U	NA	NA
Chrysene	0.090 U	<b>270</b>	0.091 U	0.088 U	0.091 U	0.02	0.2
Dibenz(a,h)anthracene	0.045 U	24 U	0.045 U	0.044 U	0.046 U	NA	NA
Fluoranthene	0.045 U	<b>2000</b>	0.045 U	0.044 U	0.21 J	80	400
Fluorene	2.6	<b>1700</b>	0.57 U	0.55 U	0.77 J	80	400
Indeno(1,2,3-cd)pyrene	0.090 U	41	0.091 U	0.088 U	0.091 U	NA	NA
Naphthalene	<b>510</b>	<b>10000</b>	<b>1000</b>	<b>950</b>	1.5 U	8	40
Phenanthrene	0.090 U	400	0.091 U	0.088 U	0.38 J	NA	NA
Pyrene	0.20 U	<b>1600</b>	0.20 U	0.20 U	0.20 U	50	250

U-Constituent not detected. Detection limit indicated.

J-Estimated concentration

VOC-Volatile Organic Compound

PAH-Polynuclear Aromatic Hydrocarbon

PAL-Wisconsin Department of Natural Resources (WDNR) Preventative Action Limit

ES-Enforcement Standard (WDNR)

NA-Not Applicable. PAL or ES not available for this parameter

Bolded values indicate concentration exceeding PAL.

Shaded and bolded values indicate concentration exceeding PAL and ES

Table 2-3

**Concentration Trends in Groundwater Monitoring Wells**  
**First Quarter 2004 through First Quarter 2007**  
**Moss-American Site**  
**Milwaukee, Wisconsin**

	MW-7S	MW-34S	MW-38S	MW-39S
<b><u>Benzene (ug/L)</u></b>				
First Quarter (March '04)	4 U	5.7 J	--	--
Second Quarter (June '04)	2 U	7.8 J	--	--
Third Quarter (September '04)	2.2 J	7.1 J	--	--
Fourth Quarter (December '04)	8.6	7.2 J	--	--
First Quarter (March '05)	2.9 J	6.2 J	--	--
Second Quarter (June '05)	1.6 J	6 J	--	--
Third Quarter (September '05)	1.8	7.3	--	--
Fourth Quarter (December '05)	1.7 J	5.0 J	--	--
First Quarter (March '06)	2.0 U	7.4 J	--	--
Second Quarter (June '06)	0.2 U	6.9 J	--	--
Third Quarter (September '06)	1.5 J	6.6 J	--	--
First Quarter (March '07)	1.0 U	8.0 J	2.0 J	1.0 U
<b><u>Naphthalene (ug/L)</u></b>				
First Quarter (March '04)	2,500	7,400	--	--
Second Quarter (June '04)	2,700	6,800	--	--
Third Quarter (September '04)	2,700	11,000 J	--	--
Fourth Quarter (December '04)	1,600	5,700	--	--
First Quarter (March '05)	1,600	6,000	--	--
Second Quarter (June '05)	1,700	7,600	--	--
Third Quarter (September '05)	1,900	6,900	--	--
Fourth Quarter (December '05)	1,000	4,400 J	--	--
First Quarter (March '06)	1,000	6,400	--	--
Second Quarter (June '06)	1.4 U	6,500	--	--
Third Quarter (September '06)	850	23,000	--	--
First Quarter (March '07)	510	10,000	1,000	1.5 U

Table 2-3 (Continued)

**Concentration Trends in Groundwater Monitoring Wells**  
**First Quarter 2004 through First Quarter 2007**  
**Moss-American Site**  
**Milwaukee, Wisconsin**

	MW-7S	MW-34S	MW-38S	MW-39S
<b><u>Fluorene (ug/L)</u></b>				
First Quarter (March '04)	7	470	--	--
Second Quarter (June '04)	6.9	280	--	--
Third Quarter (September '04)	7.8	2,100 J	--	--
Fourth Quarter (December '04)	7.5	99	--	--
First Quarter (March '05)	6.5	370	--	--
Second Quarter (June '05)	6.3	640	--	--
Third Quarter (September '05)	5.8	440	--	--
Fourth Quarter (December '05)	4.2	94 J	--	--
First Quarter (March '06)	4.0	93	--	--
Second Quarter (June '06)	0.53 U	110	--	--
Third Quarter (September '06)	4.6	5,100	--	--
First Quarter (March '07)	2.6	1,700	0.57 U	0.77 J
<b><u>Benzo(a) pyrene (ug/L)</u></b>				
First Quarter (March '04)	0.019 U	29	--	--
Second Quarter (June '04)	0.019 U	17	--	--
Third Quarter (September '04)	0.02 U	140 J	--	--
Fourth Quarter (December '04)	0.019 U	0.15	--	--
First Quarter (March '05)	0.02 U	21	--	--
Second Quarter (June '05)	0.024 J	42	--	--
Third Quarter (September '05)	0.021 U	23	--	--
Fourth Quarter (December '05)	0.021 U	0.55 J	--	--
First Quarter (March '06)	0.020 U	0.24	--	--
Second Quarter (June '06)	0.021 U	0.18	--	--
Third Quarter (September '06)	0.019 U	370	--	--
First Quarter (March '07)	0.023 U	320	0.023 U	0.023 U

U - Constituent not detected; method detection limit (MDL) of the analysis reported.

J - Estimated concentration.

ug/L - Micrograms per liter.

### SECTION 3 REFERENCES

- Weston Solutions, Inc. (WESTON). 1999. *Quality Assurance Project Plan for Installation of Groundwater Remedial System*. October 1999.
- WESTON. 2001. *Quality Assurance Project Plan for Installation of Groundwater Remedial System Addendum No.1*. May 2001.

## **APPENDIX A**

### **March 2007 Groundwater Sample Analytical Results**



## ANALYTICAL RESULTS

Prepared for:

Tronox LLC  
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Oklahoma City OK 73126-8859

405-775-5429

Prepared by:

Lancaster Laboratories  
2425 New Holland Pike  
Lancaster, PA 17605-2425

## SAMPLE GROUP

The sample group for this submittal is 1031483. Samples arrived at the laboratory on Thursday, March 29, 2007. The PO# for this group is ZAKW1KEOK0A90089.

<u>Client Description</u>	<u>Lancaster Labs Number</u>
Trip_Blank      Water	5017261
MW-7S          Groundwater	5017262
MW-34S        Groundwater	5017263
MW-29S        Groundwater	5017264
MW-38S        Groundwater	5017265
MW-38S_Dup   Groundwater	5017266

## METHODOLOGY

The specific methodologies used in obtaining the enclosed analytical results are indicated on the laboratory chronicles.

ELECTRONIC	Tronox LLC
COPY TO	
1 COPY TO	Weston Solutions, Inc.
ELECTRONIC	Tronox LLC
COPY TO	
1 COPY TO	Data Package Group

Attn: Keith Watson

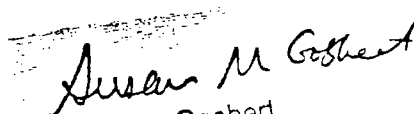
Attn: Tom Graan

Attn: Roy Widmann



Questions? Contact your Client Services Representative  
Gwen A Birchall at (717) 656-2300

Respectfully Submitted,

  
Susan M. Goshert  
Group Leader



# Analysis Report



Page 1 of 1

Lancaster Laboratories Sample No. WW 5017261

Trip Blank Water  
0128734

Moss American  
Collected: 03/23/2007

Account Number: 11947

Submitted: 03/29/2007 09:45  
Reported: 04/10/2007 at 14:56  
Discard: 06/10/2007

Tronox LLC  
P.O. Box 268859  
Oklahoma City OK 73126-8859

MSSTR SDG#: KMA87-01TB

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Method Detection Limit	Units	Dilution Factor
08213	BTEX (8021)					
00776	Benzene	71-43-2	N.D.	0.2	ug/l	1
00777	Toluene	108-88-3	N.D.	0.2	ug/l	1
00778	Ethylbenzene	100-41-4	N.D.	0.2	ug/l	1
00779	Total Xylenes	1330-20-7	N.D.	0.6	ug/l	1

State of Wisconsin Lab Certification No. EN 748

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
08213	BTEX (8021)	SW-846 8021B	1	03/30/2007 17:28	Linda C Pape	1
01145	GC VOA Water Prep	SW-846 5030B	1	03/30/2007 17:28	Linda C Pape	1



Lancaster Laboratories Sample No. WW 5017262

MW-7S Groundwater

0128734, 0128733

Moss American

Collected: 03/28/2007 10:08 by TW

Account Number: 11947

Submitted: 03/29/2007 09:45

Reported: 04/10/2007 at 14:56

Discard: 06/10/2007

Tronox LLC

P.O. Box 268859

Oklahoma City OK 73126-8859

MSS7S SDG#: KMA87-02

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Method Detection Limit	Units	Dilution Factor
08213	BTEX (8021)					
00776	Benzene	71-43-2	N.D.	1.0	ug/l	5
00777	Toluene	108-88-3	N.D.	1.0	ug/l	5
00778	Ethylbenzene	100-41-4	8.6	1.0	ug/l	5
00779	Total Xylenes	1330-20-7	8.2 J	3.0	ug/l	5
00774	PAH's in Water by HPLC					
00775	Naphthalene	91-20-3	510.	7.3	ug/l	5
00782	Acenaphthylene	208-96-8	21.	1.6	ug/l	1
00783	Acenaphthene	83-32-9	16. J	1.0	ug/l	1
00784	Fluorene	86-73-7	2.6	0.56	ug/l	1
00785	Phenanthrene	85-01-8	N.D.	0.090	ug/l	1
00789	Anthracene	120-12-7	N.D.	0.045	ug/l	1
00807	Fluoranthene	206-44-0	N.D.	0.045	ug/l	1
00811	Pyrene	129-00-0	N.D.	0.20	ug/l	1
00812	Benzo(a)anthracene	56-55-3	N.D.	0.023	ug/l	1
00818	Benzo(b)fluoranthene	205-99-2	N.D.	0.045	ug/l	1
00823	Benzo(a)pyrene	50-32-8	N.D.	0.023	ug/l	1
00895	Dibenz(a,h)anthracene	53-70-3	N.D.	0.045	ug/l	1
00898	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.	0.090	ug/l	1
00907	Benzo(g,h,i)perylene	191-24-2	N.D.	0.11	ug/l	1
07409	Chrysene	218-01-9	N.D.	0.090	ug/l	1
07410	Benzo(k)fluoranthene	207-08-9	N.D.	0.023	ug/l	1

Due to the nature of the sample matrix, a reduced aliquot was used for analysis. The reporting limits were raised accordingly.

State of Wisconsin Lab Certification No. EN 748

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Chronicle



Lancaster Laboratories Sample No. WW 5017262

MW-7S Groundwater

0128734, 0128733

Moss American

Collected: 03/28/2007 10:08 by TW

Account Number: 11947

Submitted: 03/29/2007 09:45

Reported: 04/10/2007 at 14:56

Discard: 06/10/2007

Tronox LLC

P.O. Box 268859

Oklahoma City OK 73126-8859

MSS7S SDG#: KMA87-02

No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
08213	BTEX (8021)	SW-846 8021B	1	03/30/2007 17:49	Linda C Pape	5
00774	PAH's in Water by HPLC	SW-846 8310	1	04/02/2007 19:04	Mark A Clark	1
00774	PAH's in Water by HPLC	SW-846 8310	1	04/04/2007 22:20	Mark A Clark	5
01146	GC VOA Water Prep	SW-846 5030B	1	03/30/2007 17:49	Linda C Pape	5
03337	PAH Water Extraction	SW-846 3510C	1	04/02/2007 02:30	Michael E Cunningham	1



Lancaster Laboratories Sample No. WW 5017263

MW-34S Groundwater

0128734, 0128733

Moss American

Collected: 03/28/2007 10:50 by TW

Account Number: 11947

Submitted: 03/29/2007 09:45

Reported: 04/10/2007 at 14:56

Discard: 06/10/2007

Tronox LLC

P.O. Box 268859

Oklahoma City OK 73126-8859

MSS34 SDG#: KMA87-03

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Method Detection Limit	Units	Dilution Factor
08213	BTEX (8021)					
00776	Benzene	71-43-2	8.0 J	2.0	ug/l	10
00777	Toluene	108-88-3	N.D.	2.0	ug/l	10
00778	Ethylbenzene	100-41-4	28.	2.0	ug/l	10
00779	Total Xylenes	1330-20-7	77.	6.0	ug/l	10
00774	PAH's in Water by HPLC					
00775	Naphthalene	91-20-3	10,000.	150.	ug/l	100
00782	Acenaphthylene	208-96-8	300. J	32.	ug/l	20
00783	Acenaphthene	83-32-9	2,100.	20.	ug/l	20
00784	Fluorene	86-73-7	1,700.	57.	ug/l	100
00785	Phenanthrene	85-01-8	4,500.	45.	ug/l	500
00789	Anthracene	120-12-7	480.	4.5	ug/l	100
00807	Fluoranthene	206-44-0	2,000.	23.	ug/l	500
00811	Pyrene	129-00-0	1,600.	20.	ug/l	100
00812	Benzo(a)anthracene	56-55-3	320.	2.3	ug/l	100
00818	Benzo(b)fluoranthene	205-99-2	120.	4.5	ug/l	100
00823	Benzo(a)pyrene	50-32-8	110.	2.3	ug/l	100
00895	Dibenz(a,h)anthracene	53-70-3	N.D.	24.	ug/l	20
00898	Indeno(1,2,3-cd)pyrene	193-39-5	41.	1.8	ug/l	20
00907	Benzo(g,h,i)perylene	191-24-2	44.	2.3	ug/l	20
07409	Chrysene	218-01-9	270.	1.8	ug/l	20
07410	Benzo(k)fluoranthene	207-08-9	68.	0.45	ug/l	20

The surrogate data is outside the QC limits due to unresolvable matrix problems evident in the sample chromatogram.

Due to the sample matrix an initial dilution was necessary to perform the analysis. Therefore, the reporting limits for the PAH by HPLC compounds were raised.

Due to the presence of an interferent near its retention time, the normal reporting limit was not attained for dibenz(a,h)anthracene. The reporting limit for this compound was raised accordingly.

State of Wisconsin Lab Certification No. EN 748



Lancaster Laboratories Sample No. WW 5017263

MW-34S Groundwater

0128734, 0128733

Moss American

Collected: 03/28/2007 10:50 by TW

Account Number: 11947

Submitted: 03/29/2007 09:45

Reported: 04/10/2007 at 14:56

Discard: 06/10/2007

Tronox LLC

P.O. Box 268859

Oklahoma City OK 73126-8859

MSS34 SDG#: KMA87-03

CAT	Analysis Name	CAS Number	As Received Result	As Received Method	Detection Limit	Units	Dilution Factor
No.							

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Chronicle

CAT	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
No.						
08213	BTEX (8021)	SW-846 8021B	1	03/30/2007 18:10	Linda C Pape	10
00774	PAH's in Water by HPLC	SW-846 8310	1	04/03/2007 08:04	Mark A Clark	20
00774	PAH's in Water by HPLC	SW-846 8310	1	04/03/2007 15:07	Mark A Clark	100
00774	PAH's in Water by HPLC	SW-846 8310	1	04/03/2007 15:53	Mark A Clark	500
01146	GC VOA Water Prep	SW-846 5030B	1	03/30/2007 18:10	Linda C Pape	10
03337	PAH Water Extraction	SW-846 3510C	1	04/02/2007 02:30	Michael E Cunningham	1



Lancaster Laboratories Sample No. WW 5017264

MW-29S Groundwater

0128734, 0128733

Moss American

Collected: 03/28/2007 11:42 by TW

Account Number: 11947

Submitted: 03/29/2007 09:45

Reported: 04/10/2007 at 14:56

Discard: 06/10/2007

Tronox LLC

P.O. Box 268859

Oklahoma City OK 73126-8859

MSS39 SDG#: KMA87-04

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Method Detection Limit	Units	Dilution Factor
08213	BTEX (8021)					
00776	Benzene	71-43-2	N.D.	1.0	ug/l	5
00777	Toluene	108-88-3	N.D.	1.0	ug/l	5
00778	Ethylbenzene	100-41-4	N.D.	1.0	ug/l	5
00779	Total Xylenes	1330-20-7	N.D.	3.0	ug/l	5
00774	PAH's in Water by HPLC					
00775	Naphthalene	91-20-3	N.D.	1.5	ug/l	1
00782	Acenaphthylene	208-96-8	N.D.	1.6	ug/l	1
00783	Acenaphthene	83-32-9	2.2 J	1.0	ug/l	1
00784	Fluorene	86-73-7	0.77 J	0.57	ug/l	1
00785	Phenanthrene	85-01-8	0.38 J	0.091	ug/l	1
00789	Anthracene	120-12-7	0.12 J	0.046	ug/l	1
00807	Fluoranthene	206-44-0	0.21 J	0.046	ug/l	1
00811	Pyrene	129-00-0	N.D.	0.20	ug/l	1
00812	Benzo(a)anthracene	56-55-3	N.D.	0.023	ug/l	1
00818	Benzo(b)fluoranthene	205-99-2	N.D.	0.046	ug/l	1
00823	Benzo(a)pyrene	50-32-8	N.D.	0.023	ug/l	1
00895	Dibenz(a,h)anthracene	53-70-3	N.D.	0.046	ug/l	1
00898	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.	0.091	ug/l	1
00907	Benzo(g,h,i)perylene	191-24-2	N.D.	0.11	ug/l	1
07409	Chrysene	218-01-9	N.D.	0.091	ug/l	1
07410	Benzo(k)fluoranthene	207-08-9	N.D.	0.023	ug/l	1

Due to the nature of the sample matrix, a reduced aliquot was used for analysis. The reporting limits were raised accordingly.

State of Wisconsin Lab Certification No. EN 748

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Chronicle



Lancaster Laboratories Sample No. WW 5017264

MW-29S Groundwater

0128734, 0128733

Moss American

Collected: 03/28/2007 11:42 by TW

Account Number: 11947

Submitted: 03/29/2007 09:45

Tronox LLC

Reported: 04/10/2007 at 14:56

P.O. Box 268859

Discard: 06/10/2007

Oklahoma City OK 73126-8859

MSS39 SDG#: KMA87-04

			Analysis				Dilution
No.	Analysis Name	Method	Trial#	Date and Time	Analyst		Factor
08213	BTEX (8021)	SW-846 8021B	1	03/30/2007 18:31	Linda C Pape		5
00774	PAH's in Water by HPLC	SW-846 8310	1	04/02/2007 19:43	Mark A Clark		1
01146	GC VOA Water Prep	SW-846 5030B	1	03/30/2007 18:31	Linda C Pape		5
03337	PAH Water Extraction	SW-846 3510C	1	04/02/2007 02:30	Michael E Cunningham		1



Lancaster Laboratories Sample No. WW 5017265

MW-38S Groundwater

0128734, 0128733

Moss American

Collected: 03/28/2007 12:45 by TW

Account Number: 11947

Submitted: 03/29/2007 09:45

Reported: 04/10/2007 at 14:56

Discard: 06/10/2007

Tronox LLC

P.O. Box 268859

Oklahoma City OK 73126-8859

MSS38 SDG#: KMA87-05

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Method Detection Limit	Units	Dilution Factor
08213	BTEX (8021)					
00776	Benzene	71-43-2	2.4 J	1.0	ug/l	5
00777	Toluene	108-88-3	N.D.	1.0	ug/l	5
00778	Ethylbenzene	100-41-4	7.6	1.0	ug/l	5
00779	Total Xylenes	1330-20-7	5.5 J	3.0	ug/l	5
00774	PAH's in Water by HPLC					
00775	Naphthalene	91-20-3	1,000.	7.4	ug/l	5
00782	Acenaphthylene	208-96-8	18. J	1.6	ug/l	1
00783	Acenaphthene	83-32-9	5.1 J	1.0	ug/l	1
00784	Fluorene	86-73-7	N.D.	0.57	ug/l	1
00785	Phenanthrene	85-01-8	N.D.	0.091	ug/l	1
00789	Anthracene	120-12-7	N.D.	0.045	ug/l	1
00807	Fluoranthene	206-44-0	N.D.	0.045	ug/l	1
00811	Pyrene	129-00-0	N.D.	0.20	ug/l	1
00812	Benzo(a)anthracene	56-55-3	N.D.	0.023	ug/l	1
00818	Benzo(b)fluoranthene	205-99-2	N.D.	0.045	ug/l	1
00823	Benzo(a)pyrene	50-32-8	N.D.	0.023	ug/l	1
00895	Dibenz(a,h)anthracene	53-70-3	N.D.	0.045	ug/l	1
00898	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.	0.091	ug/l	1
00907	Benzo(g,h,i)perylene	191-24-2	N.D.	0.11	ug/l	1
07409	Chrysene	218-01-9	N.D.	0.091	ug/l	1
07410	Benzo(k)fluoranthene	207-08-9	N.D.	0.023	ug/l	1

Due to the nature of the sample matrix, a reduced aliquot was used for analysis. The reporting limits were raised accordingly.

State of Wisconsin Lab Certification No. EN 748

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Chronicle





Lancaster Laboratories Sample No. WW 5017265

MW-38S Groundwater

0128734, 0128733

Moss American

Collected: 03/28/2007 12:45 by TW

Account Number: 11947

Submitted: 03/29/2007 09:45

Tronox LLC

Reported: 04/10/2007 at 14:56

P.O. Box 268859

Discard: 05/10/2007

Oklahoma City OK 73126-8859

MSS38 SDG#: KMA87-05

No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
08213	BTEX (8021)	SW-846 8021B	1	03/30/2007 18:52	Linda C Pape	5
00774	PAH's in Water by HPLC	SW-846 8310	1	04/02/2007 21:00	Mark A Clark	1
00774	PAH's in Water by HPLC	SW-846 8310	1	04/04/2007 23:05	Mark A Clark	5
01146	GC VOA Water Prep	SW-846 5030B	1	03/30/2007 18:52	Linda C Pape	5
03337	PAH Water Extraction	SW-846 3510C	1	04/02/2007 02:30	Michael E Cunningham	1



Lancaster Laboratories Sample No. WW 5017266

MW-38S Dup  
0128733

Groundwater

Moss American

Collected: 03/28/2007 12:45 by TW

Account Number: 11947

Submitted: 03/29/2007 09:45

Reported: 04/10/2007 at 14:56

Discard: 06/10/2007

Tronox LLC

P.O. Box 268859

Oklahoma City OK 73126-8859

MSSDP SDG#: KMA87-06FD\*

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Method Detection Limit	Units	Dilution Factor
08213	BTEX (8021)					
00776	Benzene	71-43-2	2.0 J	1.0	ug/l	5
00777	Toluene	108-88-3	N.D.	1.0	ug/l	5
00778	Ethylbenzene	100-41-4	6.9	1.0	ug/l	5
00779	Total Xylenes	1330-20-7	4.8 J	3.0	ug/l	5
	Normal reporting limits were not attained due to the high level of a nontarget compound.					
00774	PAH's in Water by HPLC					
00775	Naphthalene	91-20-3	950.	7.1	ug/l	5
00782	Acenaphthylene	208-96-8	N.D.	18.	ug/l	1
00783	Acenaphthene	83-32-9	4.6 J	0.99	ug/l	1
00784	Fluorene	86-73-7	N.D.	0.55	ug/l	1
00785	Phenanthrene	85-01-8	N.D.	0.088	ug/l	1
00789	Anthracene	120-12-7	N.D.	0.044	ug/l	1
00807	Fluoranthene	206-44-0	N.D.	0.044	ug/l	1
00811	Pyrene	129-00-0	N.D.	0.20	ug/l	1
00812	Benzo(a)anthracene	56-55-3	N.D.	0.022	ug/l	1
00818	Benzo(b)fluoranthene	205-99-2	N.D.	0.044	ug/l	1
00823	Benzo(a)pyrene	50-32-8	N.D.	0.022	ug/l	1
00895	Dibenz(a,h)anthracene	53-70-3	N.D.	0.044	ug/l	1
00898	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.	0.088	ug/l	1
00907	Benzo(g,h,i)perylene	191-24-2	N.D.	0.11	ug/l	1
07409	Chrysene	218-01-9	N.D.	0.088	ug/l	1
07410	Benzo(k)fluoranthene	207-08-9	N.D.	0.022	ug/l	1

Due to the nature of the sample matrix, a reduced aliquot was used for analysis. The reporting limits were raised accordingly.

Due to the presence of an interferent near its retention time, the normal reporting limit was not attained for acenaphthylene. The reporting limit for this compound was raised accordingly.

State of Wisconsin Lab Certification No. EN 748

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Lancaster Laboratories, Inc.  
2425 New Holland Pike  
PO Box 12425  
Lancaster, PA 17605-2425  
717-656-2300 Fax: 717-656-2681



Lancaster Laboratories Sample No. WW 5017266

MW-38S Dup Groundwater  
0128733

Moss American

Collected: 03/28/2007 12:45 by TW

Account Number: 11947

Submitted: 03/29/2007 09:45  
Reported: 04/10/2007 at 14:56  
Discard: 06/10/2007

Tronox LLC  
P.O. Box 268859  
Oklahoma City OK 73126-8859

MSSDP SDG#: KMA87-06FD\*

CAT	Analysis Name	CAS Number	As Received Result	As Received Method Detection Limit	Units	Dilution Factor
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## Laboratory Chronicle

CAT	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
08213	BTEX (8021)	SW-846 8021B	1	03/30/2007 19:13	Linda C Pape	5
00774	PAH's in Water by HPLC	SW-846 8310	1	04/02/2007 21:39	Mark A Clark	1
00774	PAH's in Water by HPLC	SW-846 8310	1	04/03/2007 13:36	Mark A Clark	5
01146	GC VCA Water Prep	SW-846 5030B	1	03/30/2007 19:13	Linda C Pape	5
03337	PAH Water Extraction	SW-846 3510C	1	04/02/2007 02:30	Michael E Cunningham	1



## Quality Control Summary

Client Name: Tronox LLC  
Reported: 04/10/07 at 02:56 PM

Group Number: 1031483

Matrix QC may not be reported if site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

### Laboratory Compliance Quality Control

<u>Analysis Name</u>	<u>Blank Result</u>	<u>Blank MDL</u>	<u>Report Units</u>	<u>LCS %REC</u>	<u>LCSD %REC</u>	<u>LCS/LCSD Limits</u>	<u>RPD</u>	<u>RPD Max</u>
Batch number: 07088B54A	Sample number(s): 5017261-5017266							
Benzene	N.D.	0.2	ug/l	95	99	86-119	4	30
Toluene	N.D.	0.2	ug/l	94	98	82-119	4	30
Ethylbenzene	N.D.	0.2	ug/l	96	100	81-119	3	30
Total Xylenes	N.D.	0.6	ug/l	97	100	82-120	4	30
Batch number: 07090WAE026	Sample number(s): 5017262-5017266							
Naphthalene	N.D.	1.3	ug/l	78	80	55-94	2	30
Acenaphthylene	N.D.	1.4	ug/l	80	83	59-96	3	30
Acenaphthene	N.D.	0.90	ug/l	84	86	60-116	3	30
Fluorene	N.D.	0.50	ug/l	87	89	66-106	3	30
Phenanthrene	N.D.	0.080	ug/l	88	91	67-115	3	30
Anthracene	N.D.	0.040	ug/l	85	87	67-109	3	30
Fluoranthene	N.D.	0.040	ug/l	87	90	70-112	4	30
Pyrene	N.D.	0.18	ug/l	90	94	69-113	3	30
Benzo(a)anthracene	N.D.	0.020	ug/l	91	94	73-114	3	30
Benzo(b)fluoranthene	N.D.	0.040	ug/l	91	94	72-113	3	30
Benzo(a)pyrene	N.D.	0.020	ug/l	87	89	68-112	3	30
Dibenz(a,h)anthracene	N.D.	0.040	ug/l	92	96	44-130	4	30
Indeno(1,2,3-cd)pyrene	N.D.	0.080	ug/l	96	100	60-111	4	30
Benzo(g,h,i)perylene	N.D.	0.10	ug/l	95	97	28-138	3	30
Chrysene	N.D.	0.080	ug/l	91	94	70-111	3	30
Benzo(k)fluoranthene	N.D.	0.020	ug/l	91	94	72-119	3	30

### Sample Matrix Quality Control

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike  
Background (BKG) = the sample used in conjunction with the duplicate

<u>Analysis Name</u>	<u>MS %REC</u>	<u>MSD %REC</u>	<u>MS/MSD Limits</u>	<u>RPD</u>	<u>RPD MAX</u>	<u>BKG Conc</u>	<u>DUP Conc</u>	<u>DUP RPD</u>	<u>Dup RPD Max</u>
Batch number: 07088B54A	Sample number(s): 5017261-5017266 UNSPK: P014844								
Benzene	108		78-131						
Toluene	108		78-129						
Ethylbenzene	111		75-133						
Total Xylenes	111		84-131						

### Surrogate Quality Control

Surrogate recoveries which are outside of the QC window are confirmed unless attributed to dilution or otherwise noted on the Analysis Report.

\*- Outside of specification

- (1) The result for one or both determinations was less than five times the LOQ.
- (2) The background result was more than four times the spike added.



## Quality Control Summary

Client Name: Tronox LLC  
Reported: 04/10/07 at 02:56 PM

Group Number: 1031483

### Surrogate Quality Control

Analysis Name: BTEX (8021)  
Batch number: 07088B54A  
Trifluorotoluene-P

5017261	85
5017262	85
5017263	84
5017264	85
5017265	85
5017266	85
Blank	85
LCS	85
LCSD	86
MS	86

Limits: 69-129

Analysis Name: PAH's in Water by HPLC  
Batch number: 07090WAE026

	Nitrobenzene	Triphenylene
5017262	94	94
5017263	139*	31850*
5017264	92	88
5017265	98	98
5017266	98	103
Blank	96	95
LCS	98	97
LCSD	103	100

Limits: 71-128

55-130

\*- Outside of specification

- (1) The result for one or both determinations was less than five times the LOQ.
- (2) The background result was more than four times the spike added.

Lancaster Laboratories, Inc.  
2425 New Holland Pike  
PO Box 12425  
Lancaster, PA 17605-2425  
717-656-2300 Fax: 717-656-2681

Acct. # 11947Group# 1031483Sample # 5017261-66COC # 0128734

For Lancaster Laboratories use only

Please print. Instructions on reverse side correspond with circled numbers.

For Lab Use Only

FSC: \_\_\_\_\_

SCR#: \_\_\_\_\_

Preservation Codes

H=HCl T=Thiosulfate

N=HNO<sub>3</sub> B=NaOHS=H<sub>2</sub>SO<sub>4</sub> O=Other

6

Temperature of samples  
upon receipt (if requested)

5 Analyses Requested

Preservation Codes

H

BTEX

Matrix

Potable Check if  
NPDES Applicable  
☐ NPDES  
☐4  
Total # of Containers

Soil

Water

Other

3

Composite

Date  
CollectedTime  
Collected

Grab

2  
Sample Identification

Trip Blank

mw-7s

mw-34s

mw-39s

mw-38s

3-23-07

3-28-07

1008

1050

1142

3-28-07

1245

2

3

3

3

6

Remarks

Duplicate

7 Turnaround Time Requested (TAT) (please circle): Normal Rush

(Rush TAT is subject to Lancaster Laboratories approval and surcharge.)

Date results are needed: \_\_\_\_\_

Rush results requested by (please circle): Phone Fax E-mail

Phone #: \_\_\_\_\_ Fax #: \_\_\_\_\_

E-mail address: \_\_\_\_\_

8 Data Package Options (please circle if required)

Type I (validation/NJ Reg)

Type II (Tier II)

Type III (Reduced NJ)

Type IV (CLP SOW)

Type VI (Raw Data Only)

TX TRRP-13

MA MCP CT RCP

Site-specific QC (MS/MSD/Dup)? Yes No

(If yes, indicate QC sample and submit triplicate volume)

Internal COC Required? Yes / No \_\_\_\_\_

SDG Complete?

Yes No

Relinquished by:

Tim Wall

Date Time

3-28-07

Received by:

Date Time

Relinquished by:

Date Time

Received by:

Date Time

Relinquished by:

Date Time

Received by:

Date Time

Relinquished by:

Date Time

Received by:

Date Time

Relinquished by:

Date Time

Received by:

Date Time

Acct. # 11941 Group# 1031483 Sample # 5017261-66

**COC #** 0128733

Please print. Instructions on reverse side correspond with circled numbers.

<b>1</b> Client: <u>Weston Solutions</u> Acct. #: _____ Project Name/#: <u>Moss American</u> PWSID #: _____ Project Manager: <u>Tom Graan</u> P.O.#: _____ Sampler: <u>Tina Walls</u> Quote #: _____ Name of state where samples were collected: <u>Wisconsin</u>						<b>Matrix</b> <b>4</b>								<b>5 Analyses Requested</b> <b>Preservation Codes</b>								For Lab Use Only FSC: _____ SCR#: _____			
						<input type="checkbox"/> Potable    Check if <input type="checkbox"/> Water     NPDES   Applicable <input type="checkbox"/> Other								<b>Preservation Codes</b> H=HCl       T=Thiosulfate N=HNO <sub>3</sub> B=NaOH S=H <sub>2</sub> SO <sub>4</sub> O=Other								<b>6</b> Temperature of samples upon receipt (if requested)			
<b>2 Sample Identification</b>		Date Collected	Time Collected	<b>3 Grab</b>	Composite	Soil	Water	Other	Total # of Containers	Remarks															
mw-7s		3-28-07	1008	X			X		2	RAH															
mw-34s			1050	X			X		2																
mw-39s			1142	X			X		2																
mw-38s			1245	X			X		2																
mw-38s Dup		3-28-07	1245	X			X		2																
<b>7 Turnaround Time Requested (TAT)</b> (please circle): Normal   Rush (Rush TAT is subject to Lancaster Laboratories approval and surcharge.) Date results are needed: _____ Rush results requested by (please circle): Phone   Fax   E-mail Phone #: _____ Fax #: _____ E-mail address: _____						Relinquished by: <u>Tina Walls</u> Date   Time   Received by: _____ Relinquished by: _____      Date   Time   Received by: _____ Relinquished by: _____      Date   Time   Received by: _____ Relinquished by: _____      Date   Time   Received by: _____ Relinquished by: _____      Date   Time   Received by: _____						Date   Time   Received by: _____ Date   Time   Received by: _____ Date   Time   Received by: _____ Date   Time   Received by: _____ Date   Time   Received by: _____													
<b>8 Data Package Options</b> (please circle if required) Type I (validation/NJ Reg)   TX TRRP-13 Type II (Tier II)                  MA MCP   CT RCP Type III (Reduced NJ)           Site-specific QC (MS/MSD/Dup)? Yes   No Type IV (CLP SOW)              (If yes, indicate QC sample and submit triplicate volume.) Type VI (Raw Data Only)       Internal COC Required? Yes / No _____						SDG Complete? Yes   No																			